

REMARKS

In the Office Action the Examiner indicated that claims 1-17 were pending in the application. The Examiner rejected claims 1-15 and 17 while objecting to claim 16. By this amendment, claims 1 and 9-12 have been amended, claims 8 and 17 have been cancelled and new claims 18 and 19 have been added. Thus, claims 1-7, 9-16, and 18-19 are pending in the application. The Examiner's rejections are traversed below.

Rejection under 35 U. S. C. § 103

In item 2 on pages 2-14 of the Office Action the Examiner has rejected claims 1-3, 5-9, 11-15 and 17 under 35 U.S.C. 103 as unpatentable over applicant admitted prior art (AAPA) (specification Fig. 15 and page 1, line 17 to page 5, line 2 and page 9, lines 9-18), U.S. Patent 7,092,643 to Kajiya, Mikkelsen (Photonics Technology Letters, IEEE; Vol 12, Issue 10, Oct 2000, pages 1400-1402), and U.S. Patent Publication 2004/0081470 to Griffin.

Claim 1 as amended is directed to a separating apparatus for time division multiplexed signal light, which is input with time division multiplexed signal light obtained by multiplexing a plurality of signal lights on a time axis. The apparatus includes first and second optical gate sections. The first optical gate section includes a first optical gate and a first drive circuit. Claim 1 as amended further specifies that the second optical gate section comprises a second optical gate in which an optical transmission characteristic thereof with respect to a drive voltage is periodically changed, and a second drive circuit that supplies to the second optical gate, a second drive signal having a repetition frequency equal to the repetition frequency of the first drive signal.

Referring, by way of example, to Figure 1 of the subject application and the corresponding description in the specification, a drive frequency of an MZ optical modulator 1 is the same as that for optical modulator 2. This is done by adjusting the magnitude of a drive voltage applied to the MZ optical modulator 1 without using a frequency doubler 105 which is required in the AAPA illustrated in Fig. 15 of the subject application. Thus, claim 1 as amended specifies that the second drive circuit that supplies the second drive signal to the second optical gate has a repetition frequency equal to the repetition frequency of the first drive signal.

Kajiya relates to a Mach-Zehnder (MZ) optical modulator that modulates an output optical signal based on a modulation signal. The MZ optical modulator outputs the output optical signal that is turned ON/OFF in proportion to the modulation signal. A modulation factor is set as a suitable bias voltage and is applied to the MZ optical modulator, an initial phase is set to 0, and a sinusoidal wave of a repetitive frequency is input as the modulation signal. Consequently, the

output optical signal is "output as an optical signal that is turned ON/OFF in the repetitive frequency $2F_c$ that is two times the repetitive frequency." See col. 1, lines 18-65. The MZ optical modulator modulates the continuous wave light.

The AAPA relates to a configuration of a separating apparatus where the time division multiplexed signal light is branched into two, and one branched light is supplied to a unit 100A on a clock extraction side, and the other branched light is supplied to a unit 100B on a time division separation side of the signal light. Units 100A and 100B are in common in the point of separating the time division multiplexed signal light of 160 Gb/s into 10 Gb/s signal light, and in each of the units 100A and 100B, two optical gates 101 and 102, each using the electro-absorption type optical modulators, are serially connected.

Fig. 1 of Mikkelsen discloses a time division multiplexed (TDM) signal inputted to a first EA modulator of the demultiplexer, which is formed by multiplexing 16 channels of 20 Gb/s. See page 1400, col. 2, lines 3-5). For this inputted TDM signal, the first EA modulator is a signal at 10 Gb/s. See page 1401, col. 1, second paragraph.

Griffin, which is cited in combination with Mikkelsen, merely relates to an MZ intensity modulator.

Claim 1 Patentably Disguishes Over the Prior Art

As described above, the features of amended claim 1 are not met by AAPA of the subject application. In addition in Fig 1 of Mikkelsen, the drive frequency of a first EA modulator is four times higher than that of a second EA modulator. Thus, even if the Mikkelson configuration was applied to AAPA, the use of the frequency doubler of AAPA would be indispensable.

Further, the additional cited art does not overcome the deficiencies of AAPA and Mikkelson. Therefore, it is submitted that the prior art does not teach or suggest the claimed separating apparatus which includes:

a first drive circuit that supplies to said first optical gate a first drive signal having a repetition frequency equal to the bit rate of said signal light of the plurality of signal lights, and having the voltage magnitude corresponding to a voltage difference in an $n/2$ period in the periodic optical transmission characteristic of said first optical gate; and

said second optical gate section comprises:

a second optical gate in which an optical transmission characteristic thereof with respect to a drive voltage is periodically changed, and

a second drive circuit that supplies to said second optical gate a second drive signal having a repetition frequency equal to the repetition frequency of said first drive signal.

Therefore, it is submitted that claim 1 patentably distinguishes over the prior art.

Claims 2, 3, 5-7, 9 and 11-16

Claims 2, 3, 5-7, 9 and 11-16 depend, either directly or indirectly from claim 1 and include all the features of that claims plus additional features which are not taught or suggested by the prior art. Therefore, it is submitted that claims 2, 3, 5-7, 9 and 11-16 patentably distinguish over the prior art.

Rejection of Claims 4 and 10

In items 3 and 4 of the Office Action, claims 4 and 10 were rejected on the basis of the prior art cited against claim 1 plus additional prior art relied on by the Examiner. However, the additional prior art relied on by the Examiner does not cure the deficiencies of the prior art cited against claim 1. Further, claims 4 and 10 depend from claim 1. Therefore, it is submitted that claims 4 and 10 patentably distinguish over the prior art.

Allowable Subject Matter

In item 6 on page 17 of the Office Action the Examiner objected to claim 16 but indicated this claim would be allowable if rewritten in independent form. Claim 16 depends from claims 1. Therefore, for the reasons set forth above and for the reasons indicated by the Examiner, it is submitted that claim 16 is in condition for allowance.

New Claims 18 and 19

It is noted that the subject matter of new claims 18 and 19 is such that it may be considered that part of the scope of prior claims of the application which was disclaimed in response to rejections by the Examiner is being recaptured by new claims 18 and 19. Therefore, in accordance with *Hakim v. Cannon Avent Group PLC*, 81 USPQ2d 1900, Fed Cir (2007) Applicant's "inform the Examiner that the previous disclaimer, and the prior art that it was made to avoid, may need to be re-visited" (81 USPQ2d at 1904).

New Claim 18 is directed to a demultiplexing apparatus comprising a Mach-Zehnder intensity modulator and an optical modulator. The Mach-Zehnder intensity modulator modulates time division multiplexed signal light and uses a drive signal having a repetition frequency equal to a bit rate of the plurality of signal lights and having a voltage magnitude corresponding to twice or more a V_{π} drive voltage. The modulated time division multiplexed signal light output

from the Mach-Zehnder intensity modulator is modulated by an optical modulator which uses a drive signal having the same repetition frequency as the drive signal used for the Mach-Zehnder intensity modulator. These features are not taught or suggested by the prior art. Therefore, it is submitted that claim 18 patentably distinguishes over the prior art.

Claim 19 is directed to a demultiplexing apparatus which recites:

a Mach-Zehnder intensity modulator to modulate time division multiplexed signal light which has a plurality of signal lights, and to use a drive signal having a repetition frequency equal to a bit rate of the plurality of signal lights and having a voltage magnitude corresponding to three times or more a $V \pi$ drive voltage; and

an optical intensity modulator to modulate a modulated time division multiplexed signal light output from the Mach-Zehnder intensity modulator and to use a drive signal having the same repetition frequency as the drive signal used for the Mach-Zehnder intensity modulator.

Therefore, it is submitted that claim 19 patentably distinguishes over the prior art.

Summary

There being no further outstanding objections or rejections, it is submitted that the application is in condition for allowance. An early action to that effect is courteously solicited.

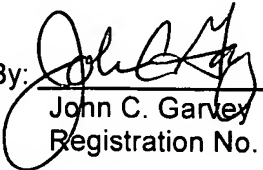
Finally, if there are any formal matters remaining after this response, the Examiner is requested to telephone the undersigned to attend to these matters.

If there are any additional fees associated with filing of this Amendment, please charge the same to our Deposit Account No. 19-3935.

Respectfully submitted,

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